DETAILED ACTION

Response to Amendment

1. The amendment, filed 3/12/2009, has been entered and made of record. Claims 1-25 are pending in the application.

Response to Arguments

1. Applicant's arguments with respect to claims 1 and 25 and the Suh reference have been considered but are moot in view of the new ground(s) of rejection.

A new grounds of rejection is being made below. However, Applicant maintains that Suh is completely missing the claimed hanger shaft with a plurality of diameters. The examiner respectfully disagrees and references the attached mark-up of Figure 2 included with the Office Action dated 6/16/2008. If we assume that the unnumbered shaft depicted in Figure 2 is Suh's lens shaft "57" viewed from the top, it can be seen that there exist an infinite number of diameters for the shaft since the shaft has some thickness. These diameters exist in the same cylindrical space. However, Suh's lens shaft "57" does not have a second diameter that protrudes in a direction of the optical axis from the first diameter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1,2,7-9,13,14 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556).

As to claim **1**, Suh teaches an imaging device (Figure 2) comprising: an imaging unit having a photoelectric converter for converting an optical image into electric signal (Figure 2, CMOS module assembly "7"); an optical unit for forming an optical image of a subject on the photoelectric converter, the optical unit comprising a lens and a lens frame which supports the lens (Figure 2, lens barrel "45") and has a hanger shaft hole (Figure 11, unnumbered hole surrounding lens shaft "57"; [0056]); a chassis on which the imaging unit is mounted (Figure 2, zoom base "5" and cover "31") and a hanger shaft is integrally formed (Figure 7, lens shaft "57"), the hanger shaft being fit into the hanger shaft hole to support the lens frame so that the lens frame is capable of moving in an optical axis direction (Figure 11; [0056]); and a drive unit for actuating the lens frame of the optical unit in the optical axis direction (Figure 5, power gear assembly "11", step motor gear "21" and step motor "9"), and wherein the hanger shaft has a plurality of diameters so that the chassis side of the hanger shaft is largest and has a reduced diameter away from the chassis side (Figure 7; lens shaft "57" has an infinite number of diameters), and wherein the hanger shaft hole has a plurality of diameters which correspond to the diameters of the hanger shaft (Figure 11, unnumbered hole has an infinite number of diameters), so that when the lens frame moves relative to the chassis, the hanger shaft moves guidelingly within the hanger shaft hole ([0056]). Although Suh is silent regarding a focusing operation of the lens barrel "45", Suh discloses that the lens barrel moves along the optical axis presumably during a zooming operation ([0056]).

In the same field of endeavor, Nomura et al. teaches a lens system wherein a chassis (Figure 20, bracket "49") includes an integrally formed shaft (Figure 20, linear guide rods "48") that guides a lens group as focusing of the lens group is performed ([0068]). The lens group includes a hole through which the shaft is inserted (Figure 20, guide holes "45"). In light of the teaching of Nomura et al., it would have been obvious to one of ordinary skill in the art to include the ability in Suh to perform focusing by guiding the lens barrel "45" along the shaft "57" as taught by Nomura et al., because an artisan of ordinary skill in the art would recognize that this would allow for a higher quality image to be obtained. Also, it would restrict rotation of the lens barrel, thereby achieving robust linear movement and higher quality focus (see Nomura et al., [0068], Lines 18-23).

As to claim **2**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 1, wherein the hanger shaft has a first diameter and a second diameter smaller than the first diameter, and wherein the hanger shaft hole has a third diameter that fits to the first diameter of the hanger shaft and a fourth diameter that is smaller than the third diameter and fits to the second diameter of the hanger shaft (Figure 7; *{Lens shaft "57" has an infinite number of diameters.*).

As to claim **7**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 2, wherein the hanger shaft has a fifth diameter between portions having the first diameter and the second diameter, and wherein the fifth diameter is smaller than the first diameter and larger than the second diameter (Figure 7; *{Lens shaft "57" has an infinite number of diameters.*).

As to claim **8**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 7, wherein the hanger shaft hole has a six diameter between portions having the third diameter and the fourth diameter, and wherein the sixth diameter is smaller than the third diameter and larger than the fourth diameter (Figure 7; *{Lens shaft "57" has an infinite number of diameters.*).

As to claim **9**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 1, wherein the hanger shaft is provided in a projected area of the imaging unit in the optical axis direction (Figure 7).

As to claims **13**, **14** and **19-21**, the limitations of claims 13,14 and 19-21 can be found in claims 1,2 and 7-9, respectively. Therefore, claims 13,14 and 19-21 are rejected as previously discussed with respect to claims 1,2 and 7-9, respectively.

2. Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556) and further in view of Terada et al. (US 2005/0185951).

As to claim **3**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 1. The claim differs from Suh, as modified by Nomura et al., in that it further requires that the hanger shaft have a taper between portions having different diameters.

In the same field of endeavor, Terada et al. teaches a lens barrel having two cam followers for engaging a cam. The followers having two diameters, one larger than the other, with a taper between the diameters (Figure 5, cam followers "46" and "47"). In light of the teaching of Terada et al., it would have been obvious to one of ordinary skill in the art to include

the taper between the diameters in the lens shaft of Suh, because an artisan of ordinary skill in the art would recognize that this would allow for a smoother and more secure fit.

As to claim **15**, the limitations of claim 15 can be found in claim 3. Therefore, claim 15 is analyzed and rejected as previously discussed with respect to claim 3.

3. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556) in view of Terada et al. (US 2005/018951) and further in view of Hayakawa et al. (US # 7,206,109).

As to claim **4**, Suh, as modified by Nomura et al. and Terada et al., teaches an imaging device as claimed in claim 3. The claim differs from Suh, as modified by Nomura et al. and Terada et al., in that it further requires that the hanger shaft hole has a taper between portions having different diameters.

In the same field of endeavor, Hayakawa et al. teaches a hole for placing an object having multiple diameters. The hole has a taper between sections having different diameters and a step between other sections having different diameters (Figure 6; Col. 9, Lines 33-38). In light of the teaching of Hayakawa et al., it would have been obvious to one of ordinary skill in the art to include this connection between the lens shaft and the unnumbered hole of Suh, because an artisan of ordinary skill in the art would recognize that this would allow for a secure pressed-fit between the hanger shaft and its hole (see Hayakawa et al., Col. 9, Lines 33-38).

As to claim **16**, the limitations of claim 16 can be found in claim 4. Therefore, claim 16 is analyzed and rejected as previously discussed with respect to claim 4.

4. Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556) and further in view of Johnson (US # 5,5,861,654).

As to claim **5**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 1. The claim differs from Suh, as modified by Nomura et al., in that it further requires that the hanger shaft have a step between portions having different diameters.

In the same field of endeavor, Johnson teaches an imaging device having a locator pin with different diameters for assembling the device. The locator pins have step portions between different diameters (Figures 4-6; Col. 4, Lines 30-55). In light of the teaching of Johnson, it would have been obvious to one of ordinary skill in the art to include the step between the different diameters for the lens shaft of Suh, because an artisan of ordinary skill in the art would recognize that this would allow for proper and secure fastening of the imaging device (see Johnson, Col. 4, Lines 50-55)

As to claim **17**, the limitations of claim 17 can be found in claim 5. Therefore, claim 17 is analyzed and rejected as previously discussed with respect to claim 5.

5. Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556) in view of Johnson (US # 5,5,861,654) and further in view of Hayakawa (US # 7,206,109).

As to claim **6**, Suh, as modified by Nomura et al. and Johnson, teaches an imaging device as claimed in claim 5. The claim differs from Suh, as modified by Nomura et al. and Johnson, in

that it further requires that the hanger shaft hole has a step between portions having different diameters.

In the same field of endeavor, Hayakawa et al. teaches a hole for placing an object having multiple diameters. The hole has a taper between sections having different diameters and a step between other sections having different diameters (Figure 6; Col. 9, Lines 33-38). In light of the teaching of Hayakawa et al., it would have been obvious to one of ordinary skill in the art to include this connection between the lens shaft and the unnumbered shaft hole of Suh, because an artisan of ordinary skill in the art would recognize that this would allow for a secure pressed-fit between the hanger shaft and its hole (see Hayakawa et al., Col. 9, Lines 33-38).

As to claim **18**, the limitations of claim 18 can be found in claim 6. Therefore, claim 18 is analyzed and rejected as previously discussed with respect to claim 6.

6. Claims 10-12 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 2003/0219244) in view of Nomura et al. (US 2002/0136556) and further in view of Kanno (US # 5,712,734).

As to claim **10**, Suh, as modified by Nomura et al., teaches an imaging device as claimed in claim 1, wherein at least the drive unit is provided in a projected area of the imaging unit in the optical axis direction (see Suh, Figure 5). The claim differs from Suh, as modified by Nomura et al., in that it further requires a detector for detecting a position of at least part of the optical unit with respect to the optical axis direction.

In the same field of endeavor, Kanno teaches a **zoom lens barrel comprising**: a zoom lens position detector for detecting a position of a zoom lens in an optical axis direction (Col. 10,

Lines 36-58; Claim 10, Lines 1 and 2). In light of the teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include **the position detector in the lens barrel of Suh**, because an artisan of ordinary skill in the art would recognize that this would the camera to effectively know when the lens is at a desired position (telephoto or wide-angle).

As to claim **11**, Suh, as modified by Nomura et al. and Kanno, teaches an imaging device as claimed in claim 10, wherein the drive unit comprises: a motor having a drive shaft parallel to the optical axis of the optical unit (see Suh, Figure 2, rotational shaft "17"); and a conversion mechanism (see Suh, Figure 2, power gear assembly "11") for converting a rotational motion of the drive shaft into a linear motion in the optical axis direction (see Suh, [0058] and [0062]). Although it is not stated explicitly, **Official Notice** is taken that the concept of providing a motor drive shaft for a focal or zoom lens that is perpendicular to the optical axis of an imaging device is well known and expected in the art. One of ordinary skill in the art would have been motivated to do this, because this can provide compact space by implementation above or below the lens barrel.

It is noted by the examiner that because applicant has failed to timely traverse the old and well known statement above, it is now taken as admitted prior art. See MPEP 2144.03 (c).

As to claim **12**, Suh, as modified by Nomura et al. and Kanno, teaches an imaging device as claimed in claim 11, wherein the conversion mechanism comprises: a driving gear provided on the drive shaft of the motor (see Suh, Figure 5, step motor gear "21"); and a cam gear meshing with the driving gear (see Suh, Figure 5, fifth gear "41"; [0047]), having a cam surface with which a cam follower formed on an extension of the optical unit is in pressure contact (see

Suh, Figure 5, gear spikes in contact with fifth gear extending from lens cam "43"), and having a shaft parallel to the optical axis of the optical unit (see Suh, Figure 2; Figure 5), and wherein at least part of the cam gear is provided in the projected area of the imaging unit in the optical axis direction (see Suh, Figure 5).

As to claims **22-24**, the limitations of claims 22-24 can be found in claims 10-12, respectively. Therefore, claims 22-24 are rejected as previously discussed with respect to claims 10-12, respectively.

7. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (US 20030219244) in view of Nomura et al. (US 2002/0136556) in view of Hayakawa et al. (US # 7,206,109)

As to claim **25**, Suh teaches an imaging device (Figure 1) comprising: a chassis (Figure 2, zoom base "5" and cover "31") on which a hanger shaft is integrally formed (Figure 2, unnumbered shaft); an imaging unit mounted on the chassis (Figure 2, CMOS module assembly "7"); an optical unit comprising a lens and a lens frame which supports the lens (Figure 2, lens assemblies "13" and "15") and has a hanger shaft hole (Figure 2, hole surrounding unnumbered shaft), the hanger shaft being fit into the hanger shaft hole to support the lens frame (Figure 2) so that the lens frame is capable of moving in an optical axis direction ([0065], Lines 1-8); and a drive unit for actuating the lens frame of the optical unit in the optical axis direction (Figure 5, power gear assembly "11", step motor gear "21" and step motor "9"). Although Suh is silent regarding a focusing operation of the lens barrel "45", Suh discloses that the lens barrel moves along the optical axis presumably during a zooming operation ([0056]). The claim also differs

from Suh in that it further requires that the hanger shaft has a first diameter and a second diameter smaller than the first diameter, and the hanger shaft hole has a third diameter which fits to the first diameter of the hanger shaft, and a fourth diameter which is smaller than the third diameter and fits to the second diameter of the hanger shaft, and wherein the lens frame is adapted to move in the optical axis direction in a state such that the first diameter of the hanger shaft guidingly slides relative to the third diameter of the hanger shaft hole, and the second diameter of the hanger shaft guideingly slides relative to the fourth diameter of the hanger shaft hole.

In the same field of endeavor, Nomura et al. teaches a lens system wherein a chassis (Figure 20, bracket "49") includes an integrally formed shaft (Figure 20, linear guide rods "48") that guides a lens group as focusing of the lens group is performed ([0068]). The lens group includes a hole through which the shaft is inserted (Figure 20, guide holes "45"). In light of the teaching of Nomura et al., it would have been obvious to one of ordinary skill in the art to include the ability in Suh to perform focusing by guiding the lens barrel "45" along the shaft "57" as taught by Nomura et al., because an artisan of ordinary skill in the art would recognize that this would allow for a higher quality image to be obtained. Also, it would restrict rotation of the lens barrel, thereby achieving robust linear movement and higher quality focus (see Nomura et al., [0068], Lines 18-23).

In the same field of endeavor, Hayakawa et al. teaches a hole for placing an object having multiple diameters. The hole has a taper between sections having different diameters and a step between other sections having different diameters (Figure 6; Col. 9, Lines 33-38). The object has a first diameter (Figure 6, diameter of object whose outer edge is denoted "13c") and a second

diameter smaller than the first diameter (Figure 6, diameter of object denoted by "13b") and is placed in a hole, wherein third and fourth diameters fit the first and second diameters (Figure 6), respectively. In light of the teaching of Hayakawa et al., it would have been obvious to one of ordinary skill in the art to include this connection between the lens shaft and the unnumbered hole of Suh, because an artisan of ordinary skill in the art would recognize that this would allow for a secure pressed-fit between the hanger shaft and its hole (see Hayakawa et al., Col. 9, Lines 33-38).

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. DANIELS whose telephone number is (571)272-7362. The examiner can normally be reached on 8:00 A.M. - 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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6/29/2009

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